PATENT

RS 9/2/01 This application claims benefit of US provisional application 60133326 filed 5/10/99 and claims benefit of US provisional application 60111287 filed 12/7/98.

PROCESS AND SYSTEM FOR RINSING OF SEMICONDUCTOR SUBSTRATES

Background and Prior Art

This invention relates to methods and equipment or systems for rinsing of semiconductor substrates such as partially processed wafers and similar materials. It is particularly useful for rinsing semiconductor substrates which have had one or more layers of metal (for example metal interconnects) deposited on them, such as during Back End of the Line (BEOL) processing in a typical semiconductor wafer fabrication sequence; however, certain aspects of the invention are also applicable to rinsing of semiconductor substrates during their manufacture, prior to deposition of metal on them, i.e. in Front End of the Line processing. In one aspect, the invention incorporates a method for preventing corrosion of said metal layers during the wet processing steps which often follow a metal etch in the BEOL process sequence.

Metallization systems used in modern integrated circuits have become increasingly complex due to the reliability concerns and yield losses associated with issues such as interdiffusion and electromigration. Solutions to these problems have involved the use of metal alloys and multilayer barrier metal schemes. Although these approaches have been effective at solving some problems, they have also introduced a new set of problems centered on the difficulty in etching these multi-metal systems. Plasma etch processes and their associated chemistries have become more aggressive. The net result has been the formation of complex, insoluble etch residues inside the metal vias and on the metal sidewalls. The mixed nature of these residues - often composed of organic, inorganic, and metallic species - has required the use of aggressive wet chemical strippers. Very often these processes involve the use of highly alkaline media such as NMP (N-methylpyrrolidinone), and various other amine-containing compounds such as HDA (hydroxylamine). An unfortunate side effect associated with such wet processing is metal corrosion, where the process